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1. A method for imaging blood flow, comprising the steps of:
- 5       perturbing arterial spins of blood flowing into the sample by applying a constant RF irradiation together with a magnetic field gradient;
- acquiring a first image of the sample;
- applying amplitude modulated RF irradiation with a
- 10       magnetic field gradient which, together, mimic the effects of constant RF radiation unrelated to blood flow;
- acquiring a second image of the sample; and
- generating a difference signal based on the first image and the second image that represents a blood flow image
- 15       of blood flowing into the sample.
2. The method of claim 1, comprising the further step of waiting a transit delay period before acquiring the first image of the sample.
3. The method of claim 2, comprising the further step
- 20       of determining a duration of the transit delay period so as to permit the blood having perturbed arterial spins to flow into a tissue, thus causing the blood flow image to be representative of perfusion.
4. The method of claim 2, comprising the further step
- 25       of determining a duration of the transit delay period so as to ensure that blood having perturbed arterial spins remains in a blood vessel of the sample, thus causing the blood flow image to be representative of large vessel blood flow.
5. The method of claim 1, wherein the step of acquiring
- 30       the first image and the step of acquiring the second image each comprises detecting a magnetic resonance signal reflected off of the sample.

6. The method of claim 5, wherein the magnetic resonance signal is an analog signal, the method further comprising the steps of:

digitizing the magnetic resonance signal to form a  
5 digital magnetic resonance signal; and  
measuring the blood flow into the sample based on  
the digital magnetic resonance signal.

7. The method of claim 1, wherein the step of applying  
amplitude modulated RF irradiation comprises applying amplitude  
10 modulated RF irradiation having a modulation frequency in the  
range of about 62.5 Hz to about 500 Hz.

8. The method of claim 7, wherein the step of applying  
amplitude modulated RF irradiation comprises applying amplitude  
modulated RF irradiation having a modulation frequency of  
15 about 62.5 Hz.

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